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U.S.S.N. 10,811,621

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Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended and new claims added to further clarify Applicants invention and overcome Examiners rejections.

No new matter has been added.

Support for the amended and new claims is found in the previously presented claims, the Figures and the Specification including at.

[0026] The composition of the present invention includes a mixture of an organic acid, such as citric acid or acetic acid, and a non-ionic polymer such as an alcohol, an amine or an alkyphenol alkoxylate. Preferably, the non-ionic polymer is a low molecular weight (<1,000 MW) non-ionic polymer. The organic acid is present in the composition mixture in a quantity of from typically about 2 to about 20 wt. %. The non-ionic polymer is present in the composition mixture in a quantity of from typically about 0.5 to about 10 wt. %.

[0027] In one embodiment, the composition includes a mixture of an organic acid such as citric acid or acetic acid and an alkoxylated alcohol such as ethoxylated alcohol polymer. Preferably, the composition includes typically about 10 wt. % of the organic acid and typically about 5 wt. % of the alkoxylated alcohol.

[0028] In another embodiment, the composition includes a mixture of an organic acid such as citric acid or acetic acid and

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an **alkoxylated polymer amine** such as **ethoxylated diamine polymer**. Preferably, the composition includes typically about 10 wt. % of the organic acid and typically about 5 wt. % of the amine.

[0029] In still another embodiment, the composition includes a mixture of an organic acid such as citric acid or acetic acid and **alkyphenol alkoxylate**. Preferably, the composition includes typically about 10 wt. % of the organic acid and typically about 5 wt. % of the alkyphenol alkoxylate.

Claim Rejections under 35 USC 112

Although Examiner is mistaken and has not made out a prima facie case that Applicants claims violate the written description requirement as would be understood by one of ordinary skill in the art, including identifying the composition mixture disposed as a suspension layer as a second composition in claim 9 as compared to the electrolyte solution, the claims have been amended to overcome Examiners rejection, to further prosecution on the merits.

Claim Rejections under 35 USC 102/103

1. Claims 1 and 2 stand rejected under 35 USC Section 102(e) as being anticipated by, or in the alternative under USC Section 103(a) as obvious over Miura et al. (USPUB 2003/0155247).

Miura et al. disclose an electrolyte solution for plating

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copper to fill vias and trenches on silicon wafers (see Abstract). The electrolyte solution of Miura et al. overcomes the problem of **dissolving a seed layer by an acid bath** by providing the electrolyte solution at a pH of from 4 to 10 and by providing a complexing agent (see paragraph 0014). Among several other types of complexing agents, Miura et al. teach that **oxycarboxylic and organic phosphonic acids in the form of salts** may be used (paragraph 0023, 0027, and 0029). Miura et al. teach that the complexing agent **serves the purpose of adjusting the pH of the electroplating solution**. Miura et al. teach that **any type of wetting agent may be added** to the electroplating solution including nonionic surfactants, anionic surfactants, cationic surfactants and amphoteric surfactants (paragraph 0043). Miura et al. teach that the electroplating solution adds to the thickness of the seed layer (paragraph 0051) **by not dissolving it**.

Thus, Miura et al. fail to disclose several aspects of Applicants disclosed and claimed invention.

Miura et al. does not teach a **non-ionic polymer**, but rather teaches complexing agents of **oxycarboxylic and organic phosphonic acids in the form of salts**, and does not disclose any particular **wetting agent**. Miura et al. teach that **any type of wetting agent** may be used including **nonionic surfactants**, anionic surfactants,

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cationic surfactants and amphoteric surfactants.

Thus, Miura et al. fails to teach a non-ionic polymer or a non-ionic polymer mixed with an organic acid or a suspension layer within and electrolyte solution.

Miura et al. does not disclose or suggest "wherein said composition is disposed as a suspension layer within said electrolyte solution, said suspension layer of sufficient dimension to form a wetting layer on a substrate as said substrate is passed through said suspension layer."

Examiner alternately argues that Applicants invention is obviousness "because Miura discloses a bath composition in a similar manner as instantly claimed. If the composition is physically the same, it must have the same properties (citing MPEP 2112.01(11)).

However, Examiner ignores the fact that the disposition or formation of a suspension layer is not a material property, but a physical arrangement of Applicants electrolyte bath, which Examiner has not shown in the prior art.

Examiner also argues that "the claims attempt to define the

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subject matter in terms of the result to be achieved ("is disposed") without proving the technical bath features necessary for achieving this result". Applicants note that Applicants claims 1 and 9 are clearly drawn to an electrolyte bath (apparatus) and are **not product by process claims** and Examiner erroneously asserts. Further, Examiner has cited nothing in the case law or MPEP that imposes the erroneous requirement that Applicants claim all technical features necessary for producing "wherein said composition is disposed as a suspension layer within said electrolyte solution". Examiner is rejecting Applicants claims based on the broadness of Applicants claims, which is nowhere found in the MPEP or the case law as a legitimate consideration in determining anticipation or obviousness.

Examiners argument, citing MPEP 2112.01, dealing with inherency, amounts to a veiled inherency argument, for which Examiner has not made out a *prima facie* case.

"To establish inherency, the extrinsic evidence must make clear that the **missing descriptive matter is necessarily present** in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Oelrich*, 666 F.2d 578,, 581-582, 212 USPQ 323, 326 (CCPA 1981).

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"In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic **necessarily flows from the teachings of the applied prior art.**" *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

Examiner has not established that the wetting agents of Miura et al. (which may be any wetting agent) **necessarily** would be disposed as a suspension in and electrolyte bath, indeed, **Miura et al. does not disclose an electrolyte bath.**

"In relying on the theory of inherency, the **examiner must provide a basis in fact and/or technical reasoning** to reasonably support the determination that the allegedly inherent characteristic **necessarily flows from the teachings of the applied prior art.**" *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Examiner has provided no legitimate technical reasoning that 'any wetting agent' including a 'non-ionic surfactant' added to the **electrolyte solution** of Miura et al. would necessarily result in Applicants invention including:

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"wherein said composition is disposed as a suspension layer within said electrolyte solution, said suspension layer of sufficient dimension to form a wetting layer on a substrate as said substrate is passed through said suspension layer."

"First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Moreover, any attempt to modify the Miura et al. to achieve Applicants invention would change the principle of operation of the complexing agents of Miura et al. (i.e., to control the pH of the electrolyte during plating) and make the electrolyte of Miura et al. unsuitable for its intended purpose (i.e., restraining the complexing agents in the suspension layer, thereby unable to

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control the pH of the electrolyte).

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Thus, *Miura et al.* is insufficient to make out a *prima facie* case of obviousness **as a matter of law**.

2. Claims 9 and 10 stand rejected under 35 USC Section 102(e) as being anticipated by, or in the alternative under USC Section 103(a) as obvious over *Miura et al.* (USPUB 2003/0155247).

Applicants reiterate the comments made above with respect to *Miura et al.*

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Applicants reiterate that nowhere do Miura et al. disclose the physical arrangement of an electrolyte bath including a suspension layer as Applicants have disclosed and claimed, and moreover, any attempt to modify Miura et al. to produce Applicants electrolyte bath including a suspension layer would render the electrolyte of Miura et al. unsuitable for its intended purpose of controlling the pH of the electrolyte.

Thus, Miura et al. is insufficient to make out a *prima facie* case of obviousness **as a matter of law**.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

"First, there must be some suggestion or motivation, either

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in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art, and not based on applicant's disclosure.**" *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

3. Claims 17 and 20 stand rejected under 35 USC Section 102(e) as being anticipated by, or in the alternative under USC Section 103(a) as obvious over Miura et al. (USPUB 2003/0155247).

Applicants reiterate the comments made above with respect to Miura et al.

Nowhere do Miura et al. teach or suggest Applicants **method** including those elements in **bold type**:

"A method for electroplating a metal onto a surface in an electroplating electrolyte solution, comprising the steps of:

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providing a composition mixture comprising an organic acid and a non-ionic polymer;

forming a suspension layer of said composition mixture within said electrolyte solution;

forming a wetting layer on said surface by passing said surface through said suspension layer and into said electrolyte solution; and

electroplating said metal onto said surface following forming said wetting layer."

Examiner erroneously argues that Applicants invention is obviousness "because Miura discloses a method in a similar manner as instantly claimed. Similar process can reasonably be expected to yield products which inherently have the same properties".

Citing In re Spada 15 USPQ 2d 1655 (CAFC 1990); In re Deblauwe 222 USPQ 191; In re Wiegand 86 USPQ 155 (CCPA 195).

Examiner misapplies In re Spada:

"Products of identical chemical composition can

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not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In re Deblauwe 222 USPQ 191 is quoted in the MPEP as only supporting the proposition (at 2144.08) (also applicable to Examiner):

However, arguments of counsel cannot take the place of factually supported objective evidence. See, e.g., *In re Huang*, 100 F.3d 135, 139-40, 40 USPQ2d 1685, 1689 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984).

In re Wiegand 86 USPQ 155 (CCPA 195) is not found in the MPEP indicating perhaps it is no longer relevant case law.

Moreover, Applicants are not claiming a product by process, which Examiner seems to erroneously assert but are claiming a method/process.

Thus, Examiner ignores the fact that the formation of a suspension layer is not a material property, and Examiner has cited no support for such a notion.

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Examiners argument, citing *In re Spada*, dealing with inherency, amount to a veiled inherency argument, for which Examiner has not made out a *prima facie* case.

"To establish inherency, the extrinsic evidence must make clear that the **missing descriptive matter is necessarily present** in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Oelrich*, 666 F.2d 578,, 581-582, 212 USPQ 323, 326 (CCPA 1981).

"In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic **necessarily flows from the teachings of the applied prior art.**" *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

Applicants further reiterate that nowhere do Miura et al. disclose the step of forming a suspension layer as Applicants have disclosed and claimed, and moreover, any attempt to modify Miura et al. to produce Applicants method including forming a suspension layer would render the complexing agents (organic acids) of Miura et al. unsuitable for its intended purpose of controlling the pH of the electrolyte.

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Thus, Miura et al. is insufficient to make out a *prima facie* case of obviousness as a matter of law.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

"First, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the

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claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim Rejections under 35 USC 103

4. Claims 3-8 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis (US 4,347,108).

Applicants reiterate the above comments with respect to Miura et al.

Even assuming *arguendo*, a proper motivation for modifying Miura et al., based on the teachings of Willis, the further fact that Willis teaches **acidic copper electroplating baths** and that **one or more wetting agents may be incorporated into the plating bath preferably dissolved in water** (see paragraph 10, lines 3-24) including **polyoxyalkylated naphthols** (col 5, lines 39-45), **nonionic agents including ether linkages** (col 6, lines 9-16), or that amines, alkanols amines, amides, and non-ionic polyglycol-type wetting agents, such modification does not further help

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Examiner in producing Applicants invention or establishing a *prima facie* case of obviousness.

Applicants again note that disposition of a suspension layer as Applicants have disclosed and claimed would make the complexing agents of Miura et al. **unsuitable for the intended purpose of controlling the pH of the electroplating solution** and adding one or more wetting agents incorporated into the plating bath preferably dissolved in water, as taught in Willis does not produce or suggest Applicants invention.

Thus, even assuming *arguendo*, a proper motivation for combination, such combination fails to produce Applicants disclosed and claimed invention **including the step of forming Applicants suspension layer within an electrolyte bath.**

Applicants again note that disposition of a suspension within an electrolyte bath is not solely dependent on material properties, and the cited reference nowhere disclose or suggest Applicants disclosed and claimed invention **including the step of forming Applicants suspension layer within an electrolyte bath.**

"First, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally

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available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. Finally, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art, and not based on applicant's disclosure.**" *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Examiners arguments directed toward claimed concentrations of Applicants suspension layer (composition), as being optimizable ranges obtainable by routine experimentation is misplaced since, Examiner has not shown several elements of Applicants invention, or any suggestion thereof in the prior art, **including a recognition of achieving a recognized result including the step of forming Applicants suspension layer within an electrolyte bath.**

"A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as

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routine experimentation." *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

5. Claims 11-16 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis (US 4,347,108).

Applicants reiterate the comments made above with respect to Miura et al. and Willis.

"First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Examiners arguments directed toward claimed concentrations of Applicants suspension layer (composition), as being

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optimizable ranges obtainable by routine experimentation is misplaced since, Examiner has not shown several elements of Applicants invention, or any suggestion thereof in the prior art, including a recognition of achieving a recognized result including Applicants suspension layer within an electrolyte bath.

"A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

6. Claims 18 and 19 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis (US 4,347,108).

Applicants reiterate the comments made above with respect to Miura et al., and Willis.

"**First**, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must

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be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Examiners Arguments

Examiner responds to Applicants arguments by seeming to assert that Applicants claims are not narrow enough. Examiner asserts that since Applicants have not specified that the bath is not agitated, or named a specific organic acid or a non-ionic polymer, that somehow Applicants claims are not entitled to be examined on their merits. Examiner has not rejected for non-enablement and is confusing the broadness of a claim with the requirements Examiner is required to meet to establish a *prima facie* case of anticipation or obviousness. Thus, Examiners statement/question "there is no specific composition of the electrolyte, specific composition of the suspension and whether or not the bath is agitated claimed. Thus, what is the complex interrelationship between them?" is irrelevant to the issue of the patentability of Applicants claims including anticipation or

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obviousness in light of the prior art.

Examiner has cited no support for the erroneous proposition that the broadness of Applicants claims somehow preclude patentability, or make Applicants claims obvious, where the elements of Applicants invention including an electrolyte bath with a suspension layer disposed therein or a method of forming a suspension layer and then passing an electroplating surface therethrough to form a wetting layer thereon prior to electroplating the surface, have not been shown or suggested in the prior art.

In response to Applicants arguments that any modification of the Miura et al. in an effort to reproduce Applicants invention would make the complexing agents of Miura et al. which are intended to control the pH of the electroplating solution, unsuitable for their intended purpose, Examiner merely states that the claims 1, 9, and 17 "as presently written do not require any specific organic acid and non-ionic polymer. Thus it is hard to tell what would have been suitable or not." Examiner confuses Applicants claims with the analysis of whether the modification of Miura et al. to achieve Applicants invention would make the invention of Miura et al. unsuitable for its intended purpose.

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Examiners responses ignore the fact that the prior art nowhere discloses or suggest Applicants method of forming a suspension layer and then:

"forming a wetting layer on said surface by passing said surface through said suspension layer and into said electrolyte solution the formation of a suspension layer" prior to electroplating.

Examiners response ignores the fact that the prior art nowhere discloses or suggest **Applicants electrolyte bath** including:

"wherein said composition is disposed as a suspension layer within said electrolyte solution, said suspension layer of sufficient dimension to form a wetting layer on a substrate as said substrate is passed through said suspension layer."

Examiners response ignores the elements of Applicants claims and erroneously attempts to shift the burden to Applicants to prove that the prior art would not form a suspension layer. Examiners apparent requirement for a more specific claim including naming a specific organic acid and non-ionic polymer is

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also erroneous, confusing the broadness of a claim with whether the elements of Applicants claims are disclosed or suggested in the prior art. Applicants respectfully remind Examiner that the **burden is on Examiner** to show the elements of Applicants claims in the prior art or a suggestion or reason that would lead one of ordinary skill to modify the prior art references to do what Applicants have done. Examiner has shown neither.

Examiners arguments for anticipation/obviousness further appear to rest on the erroneous notion that if an electrolyte having a non-ionic polymer and an organic acid is disclosed as one of a number of possible additives in the prior art, that a suspension layer as Applicants have claimed would inherently form. This inherency argument ignores common sense and is fallacious. Examiners further requirement that Applicants must identify a specific organic acid and non-ionic polymer (in order to make Applicants claims non-inherent) is also fallacious and a misapplication of the clear guidelines for establishing a prima facie case of obviousness or anticipation, especially noting that the existence of a suspension layer is nowhere disclosed or suggested in the prior art, and where Applicants method of forming a wetting layer on a surface is nowhere disclosed or suggested in the prior art.

See MPEP 2112:

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The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'

Conclusion

The cited references, singly or in combination fail to produce or suggest Applicants invention, and therefore fail to make out a *prima facie* case of anticipation or obviousness.

Applicants have amended their claims to further clarify Applicants disclosed and claimed invention and to overcome Examiners rejections under Section 112.

Applicants respectfully request consideration of their claims and submit that Applicants Claims are now in condition for allowance. Such favorable action by the Examiner at an early date

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is respectfully solicited.

In the event that the present invention as claimed is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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